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FISH HATCHERY SURVEY IN BORNO STATE, NIGERIA

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ABSTRACT

Aquaculture is regarded as being uniquely placed to reverse declining supplies from capture fisheries and for this to be realized, fish hatchery has a notable role to play. Fish hatchery is the bedrock upon which true and sustainable fish farming can be built. A field survey was conducted in the 3 geo-political zones of the State to look into the number and functionality of fish hatcheries. Results showed that there were about 23 fish hatcheries in the State with the majority concentrated in Maiduguri metropolis. Private ownership (79%) dominated of which 84% were functional. Average annual production is less than 10,000 fingerlings in most hatcheries while the wild sourced fingerlings were used as alternative by the majority. Most hatcheries (62%) made use of concrete tanks for breeding and nursery. All the respondents were of the opinion that the level of patronage was encouraging, though agreed that the level of aquaculture development in the State was low. However, few among the respondents said aquaculture development in the State is on the increase due to low productivity of natural water bodies for the past 10 years. Recommendations were made on how to improve hatchery operation that could help to boost aquaculture development in the State.

INTRODUCTION

Borno State is endowed with fish and fisheries products (Raji and Omoyeni, 2000), which are disappearing at an alarming rate due to heavy fishing pressure from increased human population density and environmental degradation coupled with global climate change. Borno State being the largest producer of fish from inland river and lakes in Nigeria should not lose their position due to climate change and over-fishing but look toward harnessing the fish culture potentials of the State. This has been suggested by Raji and Omoyeni (2001) that one of the ways to enhance fish production in the State is by shifting attention to fish culture practices. It is obvious today that aquaculture has the potential to help expand the resource base and reduce the pressure on capture fishery, generating employment, foreign exchange and elevating the socio-economic lives of the farmers (Davies *et al*., 2008).

Fish is a rich source of animal protein and its culture is an efficient protein food production system from aquatic environment. There is no doubt that fish production through aquaculture in Borno State is at its infant stage. Much attention has been directed towards increasing fish production through aquaculture in Nigeria, because of the economic and nutritional importance of fish to the populace. However, it is often negligible in Borno State because of certain constraints which fish seed scarcity is inclusive. It was noted by Olanrewaju *et al*. (2009) that the growth of aquaculture in the arid zone especially in Borno State has been poor

due to some factors which include non-availability of fish seeds.

Fish seed is the most important component of fish culture and for this to be available in abundance, there is need for well functioning fish hatcheries. A dependable source of quality fish seed (fingerling) is a fundamental prerequisite for large-scale development of fish culture. Although, fish seed could also be collected from the wild, the system is seasonal, unreliable, laborious and above all the viability of such seed cannot be assured. One of the major factors that affect all attempts to culture fish at sustainable level in Nigeria is scarcity of fish seed. Therefore, the best way of getting fish seed is through hatcheries. Fish hatcheries according to Madu (2004) are the bedrock upon which true and sustainable fish farming can be built. Hatcheries can be owned and operated either by government or private interests. Omitoyin (2007) acknowledged that fingerlings are the major input for successful aquaculture and many farms are engaged in fingerling production in Nigeria. However, the supply of fingerlings is yet to meet the demand. The need to boost fish production and for the state to maintain its leading role prompted this research work. The study was undertaken at three different zones to determine the number and the status of fish hatcheries in Borno State. The results are to form the framework for aquacultural development and intervention.

Research Area

Borno State is situated within Latitude 10^{o} 15^{o} N and 14^{o} 40^{o} N and Longitude 11^{o} $30^{'}$E and 14^{o} $45^{'}$E. It is the largest State in the Federation in terms of land mass with an area of 61,435 sq.km. Borno State is located in the North-Eastern corner of Nigeria and occupies the greatest part of the Chad Basin sharing borders with Republics of Niger to the North, Chad to the North-East and Cameroon to the East. Within the Country, its neighbours are Adamawa to the South, Yobe to the West and Gombe to the Southwest. The State has twenty-seven (27) local Government Areas that are categorized into three administrative geo-political zones of Southern Borno, Central Borno and Northern Borno. Maiduguri is the capital of Borno State and falls within central zone of the State. Based on the 2006 provisional census figures, Borno State has a population of 4,151,193 and a population density of approximately 60 inhabitants per square kilometer.

Borno State has a climate which is hot and dry for a greater part of the year although the Southern part is milder. Rainy season is normally from June to September in the North and May to October in the South with relative humidity of about 49% and evaporation of 203m per year. The State has two major vegetation zones viz; Sahel in the North with severe desert encroachment covering most of the Chad Basin areas and Sudan savannah in the South which consists of scrubby vegetation interspersed with tall tree woodlands.

MATERIALS AND METHODS

Field surveys were conducted in the 3 geo-political zones of the State. The surveys were carried out with the aid of structured questionnaire, visual observations and oral interview with both the fisheries personnel and fish farmers in two selected Local Government Areas in each zone. 60 questionnaires were administered to retrieve information in the six Local Government Areas selected to represent the entire State. These included Biu and Shani for Southern Borno, Konduga and Maiduguri for Central Borno, Gubio and Kukawa for Northern Borno. Secondary data were obtained through literature review based on published research works. Information was also retrieved from Federal Department of Fisheries, Maiduguri, Borno State. Data collected were subjected to simple statistical tools

such as means and percentages etc. and presented in graphs and tables.

RESULTS AND DISCUSSION

The study indicates that most of the respondents interviewed were males (80%). Majority (61.66%) were within the age range of 40-49years (Table1), 18.33% were within the 30-39years while 3.33% were within the 20-29years range. According to Usman (2009), the economically active age group is between 31-50years. Therefore, 79.99% of the respondents are in the economically active age group. Among the respondents (76.66%) were married while 8.33% were divorcees. 85% were Muslims while 15% were Christians. This could be attributed to the major religion of the region. Majority (51.66%) had higher education certificates from across Universities, Polytechnics and Monotechnics. 11.66% had SSCE while 16.66% had no formal education. 43.33% were civil servants, 25% were part-time fishermen while 31.66% were full-time fish farmers.

This study also showed that there were twenty-three (23) fish hatcheries in Borno State with the majority located in Maiduguri. Majority of these fish hatcheries were not organized and had no operational names. However, few among them were very organized with operational names (Table 2).

In this study, findings showed that private ownership (78.33%) dominated of which 83% were found functional (Fig.1), but their annual production is less than 10,000 fingerlings with the exception of few that had annual production around 100,000 fingerlings. These included NIFFR Zonal Office hatchery complex, Peace water fish hatchery and FCFFT Baga hatchery complex.

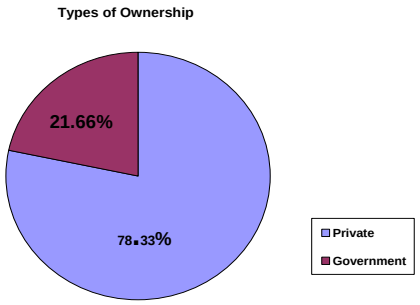

Fig 1: Types of Ownership

Fig. 2 shows that majority (71%) of the hatcheries favoured the use of open market to source for broodstocks while few (29%) obtained their broodstocks from existing farms from as far as Ijebu Ode, Ibadan and Ilorin in the Southwest Nigeria. Most hatcheries on several occasions experienced failure in production and stunted growth of fingerlings. However, all these could be as a result of wrong sources of broodstocks, resulting in total closure of such hatchery. All the respondents were of the opinion that the level of patronage was encouraging as demand is still more than supply (Table 3). This indicates that there is a great market for fingerling production in Borno State as aquaculture is becoming an attractive and important component of rural livelihoods due to increasing population pressures, environmental degradation and loss of access that limit catches from the wild.

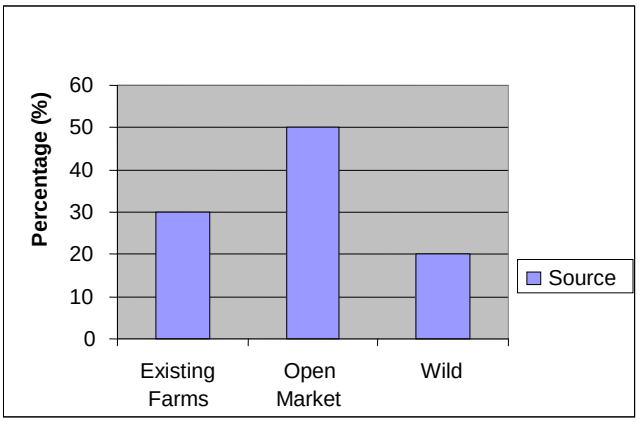

Fig. 2: Sources of Broodstock

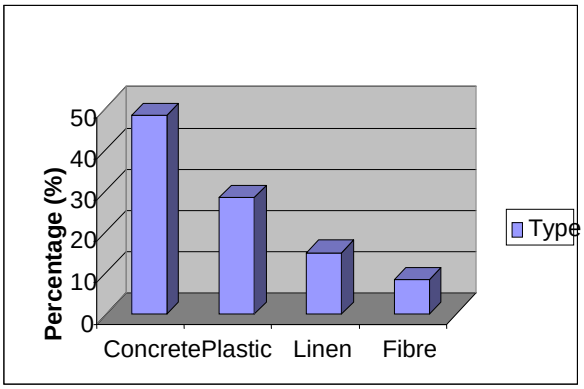

Fig. 3: Types of Breeding and Nursery Tank

Fig. 3 shows that most hatcheries (62%) made use of concrete tanks for breeding and nursing exercises, 25% used plastic tanks while 17% used linen tanks. Majority of the respondents (88%) were of the opinion that level of aquaculture development in the State was low, and this is attributed to the abundant fisheries resources in the State. Though, 9% testified to the increased aquaculture development in the State due to receeding nature of Lake Chad.

CONCLUSION

Effective aquaculture development has been identified as one of the viable means of improving local fish production in Nigeria in order to reduce the current deficit in fish demand. But for this to be realized, fish hatchery has a notable role to play by supplying adequate quality and quantity of fish seed for pond stocking. In order to achieve full potential of aquaculture in Borno State, the number of fish hatcheries need to be increased as well as the level of operation to meet market demand. Fish hatchery is characterized by constraints imposed on production efficiency. Some of the major problems faced in production are retardation in growth and low survival caused by high mortality brought about by sudden fluctuating weather conditions and infection. Hence, these problems reflect a serious set back to successful hatchery operations in Borno State. Based on the above, the following are recommended measures to improve hatchery operation in the State.

- Both Federal and State Government should collaborate and establish functional seed production centers or hatchery networks where farmers can get sufficient viable fish seeds.
- Hatchery operators should embark on further training to acquire more knowledge on induced breeding activities and hatchery management.
- All stakeholders should collaborate and form an association to ensure the development of the industry.
- Each hatchery should have broodstock bank and desist from sourcing from open markets and the wild.

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Table 1: Personal Characteristics of Respondents

Age range:	**Frequency**	**%**
20 – 29	02	3.33
30 – 39	11	18.33
40 – 49	37	61.66
50 – 59	10	16.66
> 60	--	--
Gender:		
Male	48	80
Female	12	20
Marital Status:		
Single	09	15
Married	46	76.66
Divorcee	05	8.33
Religion:		
Islam	51	85
Christianity	09	15
Educational Background:		
Higher education	31	51.66
SSCE	07	11.66
Primary School Certificate	12	20
No formal education	10	16.66
Occupation:		
Civil Servant	26	43.33
Fisherman	15	25
Fish farmer	19	31.66

Table 2: Publicly owned fish hatcheries in Borno State.

Name of Organization	Location	Status
• Abba Gumsu Fish Hatchery	Bama	Functional
• Aquachart Farm	Maiduguri	✓
• Aquaworld Fish Hatchery	"	✓
• FCFFT Baga Hatchery Complex	Baga	✓
• Gadzama Fish Farm	Bama	✓
• Gonson Farm Fish Hatchery	Maiduguri	✓
• Hatchery Complex, Ngomari	Gwoza	✓
• Kadu Fish Farm	Maiduguri	✓
• Kamput Sanda Fish Farm	"	✓
• Madagali Fish Farm	"	✓
• Malami Aquaculture	"	✓
• Megachad Fish Hatchery	Maiduguri	✓
• NIFFR Zonal Office Fish Hatchery	"	✓
• Paul Amaza Fish Farm	"	✓
• Peace Water Fish Hatchery	Mongonu	Non-functional
• Wulari Fish Hatchery Complex		

Table 3: Level of Patronage

Level	Frequency	%
Encouraged	60	100
Not encouraged	--	--